What is Claimed is:

1. A method of combining a plurality of digital signals to form a composite signal for transmission, comprising:

(a) modulating the phase and amplitude of a first component of a carrier signal by controlling a state of a first phase modulator and a state of a first variable attenuator in accordance with values of the digital signals;

(b) modulating the phase and amplitude of a second component of the carrier signal by controlling a state of a second phase modulator and a state of a second variable attenuator in accordance with values of the digital signals; and

(c) combining the first and second components of the carrier signal to form the composite signal.

2. The method of claim 1, wherein the composite signal is a constant-envelope signal.

3. The method of claim 2, wherein the composite signal is formed from the digital signals via interplex modulation.

4. The method of claim 1, wherein the digital signals are baseband signals.

5. The method of claim 1, wherein the digital signals are spread spectrum signals, and wherein the states of the first and second phase modulators and the first and second variable attenuators are controlled at the chip rate of the spread spectrum signals.

6. The method of claim 1, wherein the digital signals contain global positioning information.

7. The method of claim 1, wherein the digital signals are code division multiple access signals.

8. The method of claim 1, wherein the first and second components of the carrier signal are in-phase and quadrature components of an RF carrier signal.

9. The method of claim 1, wherein the first and second components of the carrier signal are modulated via phase shift keying.

10. The method claim 9, wherein the phase shift keying includes at least one of binary phase shift keying and quadrature phase shift keying.

11. The method of claim 1, wherein the plurality of digital signals includes three digital signals.

12. The method of claim 1, wherein:

the state of the first variable attenuator is dynamically set to one of a plurality of first attenuation levels in accordance with values of the digital signals;

the state of the second variable attenuator is dynamically set to one of a plurality of second attenuation levels in accordance with values of the digital signals; and

the first and second attenuation levels effect a relative power distribution among the digital signals within the composite signal.

13. The method of claim 1, further comprising:

(d) generating first and second phase control signals and first and second gain control signals based on values of the digital signals, wherein the first and second phase control signals respectively control the states of the first and second phase modulators, and the first and second gain control signals respectively control the states of the first and second variable attenuators.

14. The method of claim 1, wherein control of the first and second phase modulators and the first and second variable attenuators is programmable.

15. The method of claim 1, wherein the control of the first and second phase modulators and the first and second variable attenuators is remotely reprogrammable.

16. An apparatus for combining a plurality of digital signals to form a composite signal

for transmission, comprising:

a first phase modulator configured to modulate the phase of a first component of a carrier signal in accordance with values of the digital signals;

a first variable attenuator configured to attenuate the amplitude of the first component of the carrier signal in accordance with values of the digital signals;

a second phase modulator configured to modulate the phase of a second component of the carrier signal in accordance with values of the digital signals;

a second variable attenuator configured to attenuate the amplitude of the second component of the carrier signal in accordance with values of the digital signals; and

a signal combiner configured to combine the first and second components of the carrier signal to form the composite signal.

17. The apparatus of claim 16, wherein the composite signal formed by said apparatus is a constant-envelope signal.

18. The apparatus of claim 17, wherein said apparatus is configured to operate as an interplex modulator that forms the constant-envelope signal.

19. The apparatus of claim 16, wherein the digital signals are spread spectrum signals, and wherein states of the first and second phase modulators and the first and second variable attenuators are controlled at the chip rate of the spread spectrum signals.

20. The apparatus of claim 16, wherein the first and second components of the carrier signal are in-phase and quadrature components of an RF carrier signal.

21. The apparatus of claim 16, wherein said first and second phase modulators are phase shift keyed modulators which respectively modulate the phases of the first and second components of the carrier signal via phase shift keying.

22. The apparatus of claim 21, wherein said first and second phase modulators employ at least one of binary phase shift keying and quadrature phase shift keying.

23. The apparatus of claim 16, wherein said apparatus combines three digital signals into the composite signal.

24. The apparatus of claim 16, wherein:

a state of said first variable attenuator is dynamically set to one of a plurality of first attenuation levels in accordance with values of the digital signals;

a state of said second variable attenuator is dynamically set to one of a plurality of second attenuation levels in accordance with values of the digital signals; and

the first and second attenuation levels effect a relative power distribution among the digital signals within the composite signal.

25. The apparatus of claim 24, wherein said first and second variable attenuators adjust the first and second attenuation levels in accordance with adjustments in the relative power distribution among the digital signals.

26. The apparatus of claim 16, further comprising a signal generator configured to generate the digital signals in response to corresponding input signals.

27. The apparatus of claim 26, wherein the digital signals are baseband signals.

28. The apparatus of claim 26, wherein the digital signals are spread spectrum signals, and wherein states the first and second modulators and the first and second variable attenuators are controlled at the chip rate of the spread spectrum signals.

29. The apparatus of claim 26, wherein said signal generator generates first and second phase control signals and first and second gain control signals based on values of the digital signals, wherein the first and second phase control signals respectively control states of the first and second phase modulators, and the first and second gain control signals respectively control states of the first and second variable attenuators.

30. The apparatus of claim 26, wherein said signal generator is programmable to facilitate modification of signaling parameters.

31. The apparatus of claim 26, wherein said signal generator is programmable to modify a mapping between the digital signals and the first and second phase control signals and the first and second gain control signals.

32. The apparatus of claim 26, wherein said signal generator is remotely reprogrammable.

33. The apparatus of claim 16, wherein the digital signals contain global positioning information.

34. The apparatus of claim 16, wherein the digital signals are code division multiple access signals.

35. An apparatus for combining a plurality of digital signals to form a composite signal for transmission, comprising:

first means for modulating the phase of a first component of a carrier signal in accordance with values of the digital signals;

first means for attenuating the amplitude of the first component of the carrier signal in accordance with values of the digital signals;

second means for modulating the phase of a second component of the carrier signal in accordance with values of the digital signals;

second means for attenuating the amplitude of the second component of the carrier signal in accordance with values of the digital signals; and

means for combining the first and second components of the carrier signal to form the composite signal.

36. The apparatus of claim 35, wherein the composite signal formed by said apparatus is a constant-envelope signal.

37. The apparatus of claim 35, wherein said apparatus is configured to operate as an interplex modulator that forms the constant-envelope signal.

38. The apparatus of claim 35, wherein the digital signals are spread spectrum signals, and wherein states of the first and second means for modulating and of the first and second means for attenuating are controlled at the chip rate of the spread spectrum signals.

39. The apparatus of claim 35, wherein the first and second components of the carrier signal are in-phase and quadrature components of an RF carrier signal.

40. The apparatus of claim 35, wherein said first and second means for modulating are phase shift keyed modulators which respectively modulate the phases of the first and second components of the carrier signal via phase shift keying.

41. The apparatus of claim 35, wherein said first and second means for modulating employ at least one of binary phase shift keying and quadrature phase shift keying.

42. The apparatus of claim 35, wherein said apparatus combines three digital signals into the composite signal.

43. The apparatus of claim 35, wherein:

a state of said first means for attenuating is dynamically set to one of a plurality of first attenuation levels in accordance with values of the digital signals;

a state of said second means for attenuating is dynamically set to one of a plurality of second attenuation levels in accordance with values of the digital signals; and

the first and second attenuation levels effect a relative power distribution among the digital signals within the composite signal.

44. The apparatus of claim 43, wherein said first and second means for attenuating adjust the first and second attenuation levels in accordance with adjustments in the relative power distribution among the digital signals.

45. The apparatus of claim 35, further comprising means for generating the digital signals in response to corresponding input signals.

46. The apparatus of claim 45, wherein the digital signals are baseband signals.

47. The apparatus of claim 45, wherein the digital signals are spread spectrum signals, and wherein states the first and second means for modulating and the first and second means for attenuating are controlled at the chip rate of the spread spectrum signals.

48. The apparatus of claim 45, wherein said signal generator generates first and second phase control signals and first and second gain control signals based on values of the digital signals, wherein the first and second phase control signals respectively control states of the first and second means for modulating, and the first and second gain control signals respectively control states of the first and second means for attenuating.

49. The apparatus of claim 45, wherein said signal generator is programmable to facilitate modification of signaling parameters.

50. The apparatus of claim 45, wherein said signal generator is programmable to modify a mapping between the digital signals and the first and second phase control signals and the first and second gain control signals.

51. The apparatus of claim 45, wherein said signal generator is remotely reprogrammable.

52. The apparatus of claim 35, wherein the digital signals contain global positioning information.

53. The apparatus of claim 35, wherein the digital signals are code division multiple access signals.

54. A programmable waveform generator for generating a composite transmission signal from a plurality of digital signals, comprising:

a signal generator configured to generate the plurality of digital signals; and

a carrier modulator configured to modulate in-phase and quadrature components of a carrier signal, said carrier modulator including: an in-phase phase modulator for modulating the phase of the in-phase component of the carrier signal and an in-phase variable attenuator for attenuating the amplitude of the in-phase component of the carrier signal in accordance with values of the digital signals; a quadrature phase modulator for modulating the phase of the quadrature component of the carrier signal; and a quadrature variable attenuator for attenuating the amplitude of the quadrature component of the carrier signal in accordance with values of the digital signals, said carrier modulator combining the in-phase and quadrature components of the carrier signal to form the composite transmission signal.

55. The programmable waveform generator of claim 54, wherein said signal generator comprises:

a digital bit stream generator configured to generate a plurality of digital bit streams from corresponding input data signals; and

a control signal generator configured to generate phase and gain control signals from the digital bit streams, for controlling states of the in-phase and quadrature phase modulators and variable attenuators.

56. The programmable waveform generator of claim 55, wherein said digital bit stream generator is programmable to facilitate modification of signaling parameters.

57. The programmable waveform generator of claim 55, wherein said control signal generator is programmable to facilitate modification of a mapping between the digital bit streams and the phase and gain control signals.

58. The programmable waveform generator of claim 55, wherein the digital signals are spread spectrum signals, and wherein the phase and gain control signals control the states of the in-phase and quadrature phase modulators and variable attenuators at the chip rate of the spread

spectrum signals.

59. The programmable waveform generator of claim 54, wherein the in-phase and quadrature phase modulators are phase shift keyed modulators which respectively modulate the first and second components of the carrier signal via phase shift keying.

60. The programmable waveform generator of claim 54, wherein said signal generator is remotely reprogrammable.

61. The programmable waveform generator of claim 54, wherein the digital signals contain global positioning information.

62. The programmable waveform generator of claim 54, wherein the digital signals are code division multiple access signals.

63. The programmable waveform generator of claim 54, wherein the composite transmission signal formed by said programmable waveform generator is a constant-envelope signal.

64. The programmable waveform generator of claim 54, wherein said programmable waveform generator is configured to operate as an interplex modulator.